

**CLAIMS:**

1. An apparatus for transmitting data, the apparatus comprising:  
segmenting means for segmenting data into data frames;  
buffering means for buffering the data frames from the segmenting means;  
5 transmitting means, connected to the buffering means to receive data frames therefrom, for transmitting the data frames; and  
controlling means for controlling the segmenting means, the controlling means being arranged to receive parameter data from the segmenting means and the transmitting means pertaining to the data and to the transmission of data frames, to  
10 calculate a high watermark value and a low watermark value corresponding to maximal and minimal numbers of data frames to be buffered in the buffering means, and to control the segmenting means to maintain the number of data frames in the store between the high and low watermark values.
- 15 2. An apparatus as claimed in claim 1, wherein the controlling means is arranged to define a high band of values including the high watermark value and a low band of values including the low watermark values.
- 20 3. An apparatus as claimed in claim 2, wherein the controlling means is arranged to generate a suspend signal for the segmenting means when the number of data frames in the buffering means is in the high band.
- 25 4. An apparatus as claimed in claim 2 or 3, wherein the controlling means is arranged to generate a resume signal for the segmenting means when the number of data frames in the buffering means is in the low band.
5. An apparatus as claimed in any preceding claim, wherein the controlling means is operable to control the transmitting means, the controlling means being arranged to generate a buffer empty signal for the transmitting means when the  
30 buffering means contains no data.
6. An apparatus as claimed in any preceding claim, wherein the segmenting means is arranged to transfer to the controlling means parameter data pertaining to time-out value of a retransmission timer susceptible to delay.

7. An apparatus as claimed in claim 6, wherein the controlling means is arranged to calculate a transmit delay time by multiplying the time-out value by a constant.

5

8. An apparatus as claimed in any preceding claim, wherein the segmenting means is arranged to transfer to the controlling means parameter data pertaining to the size of the largest data frame that may be transmitted by the transmitter.

10

9. An apparatus as claimed in claim 8, wherein the controlling means is arranged to calculate the size of the largest frame from the largest data frame that may be passed to the transmission means for transmission.

15

10. An apparatus as claimed in claim 9, wherein data frames may be transmitted in acknowledged and unacknowledged modes, and the controlling means is arranged to calculate the size of the largest frame as the greater of the largest data frame that may be passed to the transmission means for transmission in the acknowledged mode and the largest data frame that may be passed to the transmission means for transmission in the unacknowledged mode.

20

11. An apparatus as claimed in claim 10, wherein the transmitting means is arranged to transmit data according to an allocated coding scheme and a number of allocated transmission slots and to transfer to the controlling means parameter data pertaining to the coding scheme, and the controlling means is arranged to calculate a transmit rate from the allocated coding scheme and the number of allocated transmission slots.

25

12. An apparatus as claimed in claim 11, wherein the controlling means is arranged to calculate the high watermark value from the calculated size of the largest frame and the calculated transmit rate.

30

13. An apparatus as claimed in any preceding claim, wherein the controlling means is arranged to calculate the low watermark value as a fraction of the high watermark value.

- 5           14. A method of transmitting data, the method comprising:  
segmenting data into data frames;  
buffering the data frames;  
receiving buffered data frames;  
transmitting the data frames;  
10           receiving parameter data pertaining to the data and to the transmission of data frames;  
calculating a high watermark value and a low watermark value corresponding to maximal and minimal numbers of data frames to be buffered; and  
maintaining the number of buffered data frames between the high and low  
15 watermark values.

- 15           15. A method as claimed in claim 14, further comprising defining a high band of values including the high watermark value and a low band of values including the low watermark values.

- 20           16. A method as claimed in claim 15, further comprising generating a suspend signal for the segmenting when the number of buffered data frames is in the high band.

- 25           17. A method as claimed in claim 15 or 16, further comprising generating a resume signal for the segmenting when the number of buffered data frames is in the low band.

- 30           18. A method as claimed in any of claims 14 to 17, further comprising generating a buffer empty signal for the transmitting when there are no buffered data frames.

19. A method as claimed in any of claims 14 to 18, further comprising calculating a transmit delay time by multiplying a time-out value of a retransmission timer susceptible to delay by a constant.

5           20. A method as claimed in any of claims 14 to 19, wherein data frames may be transmitted in acknowledged and unacknowledged modes, the method further comprising calculating the size of the largest frame that may be transmitted by the transmitter as the greater of the largest data frame that may be transmitted in the acknowledged mode and the largest data frame that may be transmitted in the  
10 unacknowledged mode.

          21. A method as claimed in claim 20, wherein data is transmitted according to an allocated coding scheme and a number of allocated transmission slots, the method further comprising calculating a transmit rate from the allocated coding  
15 scheme and the number of allocated transmission slots.

          22. A method as claimed in claim 21, wherein the high watermark value is calculated from the calculated size of the largest frame and the calculated transmit  
20 rate.

          23. A method as claimed in any of claims 14 to 22, wherein low watermark value is calculated as a fraction of the high watermark value.

          24. A data transmitter in which incoming data for transmission is divided  
25 into data blocks and passed in frame transmission order to a radio link stage via a serial frame buffer which holds the data until the radio link is able to transmit it, the incoming data having associated with it various parameters and the radio link stage having allocated to it radio link resources which parameters and resources change independently of each other from time to time and are supplied to a controller which  
30 calculates high and low buffer levels therefrom and controls the passing of the data frames through the frame buffer to maintain the number of frames in the buffer at any instant of time at a level between the calculated high and low levels.

25. An apparatus or method substantially as described herein with reference to the accompanying drawings.

5

10